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**GUIDED IMAGING SYSTEM****TECHNICAL FIELD**

The present invention generally relates to medical imaging devices, more particularly, to devices for the wireless controlled movement of medical imaging equipment.

**BACKGROUND OF THE INVENTION**

Most interventional imaging systems use an X-ray source connected to an image intensifier (I-I) which can be utilized before, during and after a procedure. As in other medical procedures, the operator may be an assistant to the medical practitioner guided under the practitioner's directions. Typically, this requires either the operator or an assistant to physically move or adjust the imaging system using a joystick (or other manual mechanism requiring hands on) on an examination table. The medical practitioner may prefer the benefit of both controlling such an imaging system while performing the procedure. In order to operate such imaging systems, the unit is moved in various directions using hand held controls on the operating table. Movement of this device is necessary to obtain desired views of the object/patient being studied.

Potential problems with this approach include the operator having to take his hands off of the procedure to adjust the imaging, which can lead to complications of a medical error or increased time to perform the procedure. In another example, an assistant may have other responsibilities during the procedure such that repositioning the camera may introduce positional error and, similarly, prevents the assistant from concentrating on another related task. There are instances when considerable movement occurs during a critical part of the procedure, thus adding to complexity and risk of a medical error or injury to the subject.

Current operation of such imaging systems have progressed over the years to allow not only improved optical resolution and subminiature size but also improved responsiveness through the use of various user interface options such as handheld controls, joystick, mouse, or touch screen. These advances, though furthering the capacity and utility of this technology, still leave room for improvement by still sharing the common requirement to utilize the hands of the person controlling the system. This presents complications when the medical practitioner needs use of the hands for other related tasks. Therefore, as medical procedures get increasing complex there is a need for a device that can help solve or reduce the need for medical personnel to correct imaging apparatus or take away the medical personnel from the surgical treatment at hand.

In light of the foregoing considerations, and relative to the present state of the art, the need for hands-free control or guidance of I-I imaging systems remains to be sufficiently addressed. Furthermore, it remains desirable and advantageous to more efficiently maneuver such imaging systems without taking attention from other related tasks so as to create an error or risk to the subject. Finally, having a hands-free solution that can track a medical practitioner's movements, without the need for third party interaction satisfies the operators visualization requirement without having to interrupt the procedure.

**SUMMARY OF THE INVENTION**

It is therefore an object of the present invention to provide a wireless control device that will enable the user to guide the position of an I-I imaging system without the use of the user's

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hands. It is a further object of the present invention to a provide a highly responsive wireless control that may enable the user to multitask by performing an independent task with the hands while simultaneously guiding the imaging system.

In one embodiment of the present invention, the wireless control mechanism that controls the guided imaging system may be mounted on the body of the user. In one embodiment of the present invention, the wireless control mechanism that controls the guided imaging system may be mounted on the head or upon a headpiece of the user. In a further embodiment of the present invention, the wireless control mechanism that controls the guided imaging system may include a voice activated control system for enabling the user to use voice commands to activate and operate the guided imaging system. The voice activated control system may comprise an audio microphone configured to receive audio or voice input commands or signals from the user, an audio receiving unit for receiving the audio or voice input commands or signals, and an audio or voice signal processor coupled to the audio receiving unit for processing the audio or voice input commands or signals. In one embodiment of the present invention, the guided imaging system may be used in a sterile environment. In a further embodiment of the present invention, the guided imaging system may be used in a healthcare facility.

In yet another embodiment of the present invention, the guided imaging system may respond similarly to that of the Nintendo Wii® controller. In one embodiment of the present invention the wireless controller may be capable of responding to direction in one or more of the following linear directions: horizontal (X), vertical (Y) and depth (Z) directions and communicate these directions to the I-I. In one embodiment of the present invention the I-I may be capable of responding to direction in one or more of the following rotational directions: pitch (rotation about the vertical axis), roll (rotation about the horizontal axis), and yaw (rotation about the depth axis). In a further embodiment of the present invention, the speed of movement of the user may be translated into the speed at which the guided imaging system, (I-I) movement, responds. The speed of movement may further accompany one of the linear directions or one or more of the rotational directions.

In another embodiment of the present invention the imaging monitors may be capable of responding to direction independently or in concert with the movement of the I-I, as shown in FIG. 3.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The foregoing and other objects, aspects and advantages will be better understood from the following detailed description of preferred embodiments of the invention with reference to the drawings. In the drawings, like reference characters generally refer to the same parts throughout the different views. Also, the drawings are not necessarily to scale, emphasis instead generally being placed upon illustrating the principals, elements and inter-relationships of the invention.

FIG. 1 is a drawing of a C-arm imaging system having an image intensifier and controllers to position both the imager and table holding the object under observation.

FIG. 2 is a drawing of an image system having an image sensor in multiple positions relative to the x-ray source that can include single or multiple image arrays.

FIG. 3 is a drawing of an image system mountable from a wall or ceiling that incorporates monitors and having a swivel adjustable sensor.